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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,008	07/07/2003	Gilad Almogy	PDC/7811	8177

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EXAMINER

NGUYEN, HUNG

ART UNIT PAPER NUMBER

2851

DATE MAILED: 09/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/615,008

Applicant(s)

ALMOGY ET AL.

Examiner

Hung Henry V. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Regarding claim 39, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 9, 14, 17-19, 22 and 40, are rejected under 35 U.S.C. 103(a) as being unpatentable over Paufler et al (U.S.Pat. 5,936,713) in view of Gross (U.S.Pat. 6,765,934).

With respect to claims 1, 2, 9, 14, 17-19, 22 and 40, Paufler discloses a method for recording a predefined multiple intensity level image on a substrate (318) and comprising substantially all of the limitations of the instant claims including: converting the predefined image to multiple intensity level associated images via beam splitter (310) and converting a light beam to multiple light beam arrays and modulating, using reflective spatial modulators (302a-302d ; see col.7, lines 16-23) each light beam array to generate modulated light beam array in response to a corresponding intensity level associated image to be recorded on the substrate (see col.4, lines 54 thru col.5, line 6), and directing each modulated light beam array to impinge on

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the substrate (see figure 4) and the maskless photolithography steps and repeats so that the entire surface of the wafer (318) is exposed and the light beam is generated by a pulsed laser (see col.4, line 54). Paufler further discloses a step of eliminating coherence between different modulated light beam arrays (see col.5, lines 34-47) and the intensity levels associated with intensity level associated image being different from each other by a factor of two (see col.4, lines 18-35).

Paufler does not expressly disclose each of the multiple light beam array having a different intensity. However, this feature is well known per se in the art. For example, Gross teaches a method for recording an image on a photosensitive substrate wherein a beam splitter (22) is provided for converging a light beam to multiple light beam arrays, each of which has a different intensity. In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Paufler and Gross to obtain the invention as specified in the instant claims. It would have been obvious to a skilled artisan to employ the beam splitter as taught by Gross into the apparatus/method of Paufler. The purpose of doing so would have been to generating a plurality of patterned sub-beams of different intensities and for improving the resolution of the images to be printed.

3. Claims 1-11, 13-22 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gross (U.S.Pat. 6,765,934) in view of Sandstrom (U.S.Pat. 6,618,185).

With respect to claims 1-11, 13-22 and 40, 22, Gross discloses a method for recording a predefined multiple intensity level image on a substrate (35) and comprising substantially all basic steps of the instant claims including: converting the predefined image to multiple intensity level associated images via beam splitter (see col.3, lines 49-50 and figure 2) and converting a

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light beam to multiple light beam arrays and modulating each light beam array to generate modulated light beam array in response to a corresponding intensity level associated image to be recorded on the substrate (see col.4, lines 16-23), and directing each modulated light beam array to impinge on the substrate and the photolithography steps and repeats by moving the substrate stage so that the entire surface of the wafer is exposed and the light beam is generated by a pulsed laser (see abstract). Gross further discloses a step of eliminating coherence between different modulated light beam arrays by using at least one optical delay path which receives the split light beams and delays the split beams by different amount (see col.3, lines 50-55) and the optical delay comprises a polarizing cube beam splitter and two retro-reflectors (see figure 2). Gross further teaches the intensity levels associated with intensity level associated image being different from each other by a factor of two (see col.4, lines 18-35) as well as steps of altering an intensity of at least one modulated light beam array by polarization (see col.10, lines 9-57) and step of focusing (element 30) the converted light beam on the substrate (35). Gross lacks to show the spatial modulators beings reflective spatial modulators as recited in the instant claims. However, a use of a reflective spatial light modulator, a reflective liquid crystal display (LCD), in a maskless lithography system or method is well known in the art. For instance, Sandstrom teaches a method for recording a predetermined multiple intensity level image on a substrate where reflective modulators are used for generating modulated light beams arrays (see claim 46). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Gross and Sandstrom to obtain the invention as specified in the above mentioned claims. It would have been obvious to a skilled artisan to employ reflective spatial modulators as taught by Sandstrom into method/apparatus of Gross for the purpose of

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generating grayscale in the lithography method/system and improving the resolution of the images.

4. Claims 23-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gross (U.S.Pat. 6,765,934) in view of Johnson (U.S.Pat. 6,301,000).

As to claims 23-41, Gross discloses a method for recording a predetermined multiple intensity level image on a substrate and comprising substantially all of the limitations of the instant as discussed above. Gross does not expressly disclose the spatial modulators being reflective spatial modulators as recited in the instant claims. However, a use of a binary spatial light modulator in a maskless lithography system/method is well known in the art. For instance, Johnson teaches a method for recording a predetermined multiple intensity level image on a substrate where a binary modulator is utilized for generating modulated light beams arrays (see col.1, lines 63-64). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Gross and Johnson to obtain the invention as specified in the above mentioned claims. It would have been obvious to a skilled artisan to employ a binary reflective spatial modulator as suggested by Johnson into method/apparatus of Gross for the purpose of generating grayscale and improving the resolution of the images.

Response to Amendment/Argument

5. Applicant's amendment filed July 11, 2005 has been entered. With respect to prior art rejection, applicant's arguments have been carefully reviewed but have been traversed in view of new ground rejections as set forth above.

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6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Henry V. Nguyen whose telephone number is 571-272-2124. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in dark ink, appearing to read 'Hung Henry V Nguyen', with a long horizontal flourish extending to the right.

Hung Henry V Nguyen
Primary Examiner
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hvn
9/12/05